

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
31 March 2005 (31.03.2005)

PCT

(10) International Publication Number
WO 2005/029704 A1

(51) International Patent Classification⁷: **H03K 19/173**

(21) International Application Number:
PCT/US2004/030580

(22) International Filing Date:
17 September 2004 (17.09.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/504,380 17 September 2003 (17.09.2003) US

(71) Applicant (for all designated States except US): **THE REGENTS OF THE UNIVERSITY OF CALIFORNIA [US/US]**; 1111 Franklin Street, 12th Floor, Oakland, CA 94607-5200 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **VERBAUWHEDE,**

Ingrid, M. [US/US]; 1123 23rd Street #C, Santa Monica, CA 90403 (US). **TIRI, Kris, J.V.** [BE/BE]; De Hutten 16, B-3600 Genk (BE).

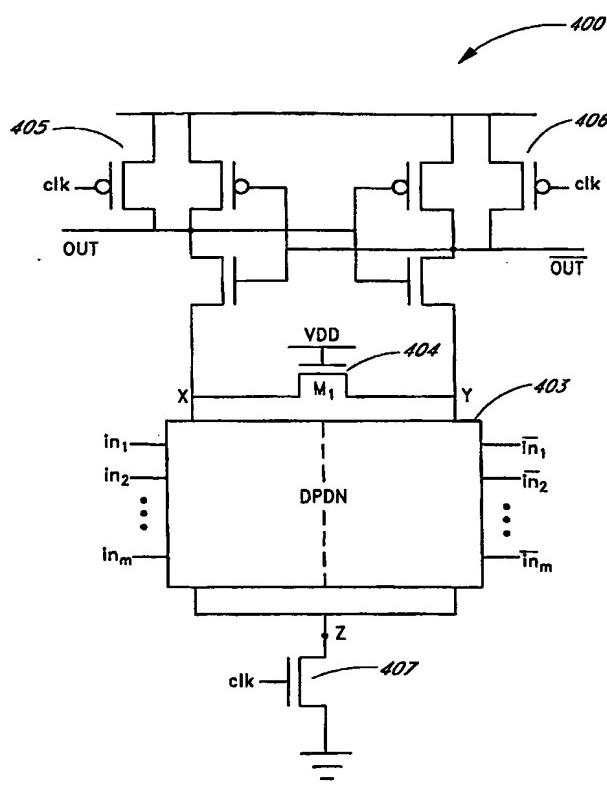
(74) Agent: **ALTMAN, Daniel, E.; Knobbe, Martens, Olson and Bear, LLP**, 2040 Main Street, Fourteenth Floor, Irvine, CA 92614 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): **ARIPO** (BW, GH,

[Continued on next page]

(54) Title: A DYNAMIC AND DIFFERENTIAL CMOS LOGIC WITH SIGNAL-INDEPENDENT POWER CONSUMPTION TO WITHSTAND DIFFERENTIAL POWER ANALYSIS



(57) Abstract: A dynamic and differential CMOS logic style is disclosed in which a gate uses a fixed amount of energy per evaluation event. The gate switches its output at every event and loads a constant capacitance. The logic style is a Dynamic and Differential Logic (DDL) style. The DDL style logic typically has one charging event per clock cycle and the charging event does not depend on the input signals. The differential feature masks the input value because a precharged output nodes is discharged during the evaluation phase. The dynamic feature breaks the input sequence: the discharged node is charged during the subsequent precharge phase.

WO 2005/029704 A1



GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

Declaration under Rule 4.17:

- *of inventorship (Rule 4.17(iv)) for US only*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.